بسم الله الرحمن الرحيم

عنوان المحاضرة: Urethral Injury
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-About 10% of all injuries seen in the emergency room involve the GU system to some extent.
-Many of them are difficult to define and require great diagnostic expertise.
-Early diagnosis is essential to prevent serious complications.

Initial assessment:

1-Control of hemorrhage and shock along with resuscitation that may require IV lines and a urethral catheter.
**In men, before the catheter is inserted, the urethral meatus should be examined carefully for the presence of blood. BUT start 1st with ascending urethrogram.
2-History should include a detailed description of the accident.
3-In cases involving gunshot wounds, the type & caliber of the weapon should be determined, since high velocity projectiles cause much more extensive damage.
4-Fractures of the lower ribs are often associated with renal injuries.
5-Pelvic fractures often accompany bladder and urethral injuries.
6-Diffuse abdominal tenderness is consistent with perforated bowel, free intraperitoneal blood or urine..

Posterior urethral injury

Anatomy:

-The urethra is divided into four parts in men: Prostatic - Membranous - Bulbous - Penile
-The Posterior urethra is formed by Prostatic & Membranous parts
-Blood supply: Urethral artery (branch of common penile artery which is a branch of internal pudendal a.)
  **The other 2 branches of common penile a. also give supply as:
    -Circumflex branches from dorsal penile a.   -Emissary branches from the cavernosal artery

N.B.
-Posterior urethral injuries are the most debilitating of the urinary tract.
-Improper management may lead to life long disabilities.
-There is still unresolved controversy about the initial ttt of the of the pelvic fracture urethral injury.

Incidence:

-With pelvic fracture in 3.5 - 19%   -More in the first 3 decades
-Rare in females 2-4%   -Associated bladder rupture is 15%

Etiology:

a) Blunt trauma (90%): -With pelvic fracture (most common) -Without pelvic fracture (Shear injury)
b) Penetrating injuries to the perineum.   c) Iatrogenic injury caused by endoscopy or catheter
d) In females Pelvic fracture: -During surgery for vaginal repair. -Ischemic injury due to obstructed labor

Mechanism of injury:

-Sharp bone fragment may directly injure the bladder neck and urethra.
-Sudden explosive migration of the prostate & bladder with stretching of the urethra at the prostato-urethral junction (Shear Phenomenon)

Types of pelvic fracture:

a) Stable: -Up to the 3 ischiopubic rami   -Isolated fracture of the iliac bone or the sacrum
b) Unstable: -All 4 rami (straddle)   -Anterior and posterior arch of the pelvic ring (Malgaigne)

Risk factors:

Age: high risk in children   *Sex:* less common in females   *Type of pelvic fracture:* unstable type

Types of posterior urethral injury:
1-Incomplete: contusion or laceration 2-Partial (27%) 3-Complete (73%)
**Amount of bleeding at the meatus has NO relation to the severity of the injury

Classification of urethral injury (AAST):
Type I: Contusion Type II: stretched intact posterior urethra
Type III: Partial disruption Type IV: Complete disruption
Type V: bladder neck and postatic urethra (only in boys with undeveloped prostate).
**If bladder neck injury isn't diagnosed and treated it may lead to incontinence

Classification of urethral injury (female):
-Usually partial at 12 o'clock position. -Complete disruption (Uncommon).
-Associated with vaginal laceration & pelvic fracture
-Avulsion of Proximal urethra which may involve the bladder neck is the most common
-Distal urethra ruptures usually 5 mm proximal to external meatus.

Diagnosis:
1-History: Vehicle accident or fall from height
2-Triad of: (Blood at the meatus - Inability to urinate - Palpable full bladder)
3-D.R.E. (Digital Rectal Examination) → high riding prostate in 34%
4-Retrograde urethrogram:
  a-Complete: extravasation without visualization of the proximal urethra and bladder
  b-Partial: extravasation with partial filling of the proximal urethra and the bladder
  c-Fallacies: proximal urethra may not be filled in partial type due to spasm of the external sphincter or massive extravasation
**In Normal retrograde urethrogram: The bulbar urethra has a "cone" shape
**During Cystogram, bladder should be evacuated so that the extravasation appears
5-Diagnostic catheterization XXXXXXX (Forbidden)
-Shouldn't be done in any suspected urethral injury -It may convert partial injury into complete
-Exit into the preprostatic region causing infection
-May pass easily to the bladder without detecting partial rupture

***Female urethral injury*
1-Injury is often overlooked.
2-Suspected: (pelvic fracture, vaginal lacerations and bleeding - inability to void – Urethral bleeding or Hematuria - labial edema)
3-Suspected injury should be confirmed by Urethroscopy

***Urethral injury in children*
-It follows the same mechanism of injury in adults.
-Posterior urethral injury can involve the prostatic urethra (as prostate isn't well developed) & bladder Neck as well as the membranous urethra -It is more likely to be complete rupture.
-The more proximal the injury, the greater the risk of incontinence, impotence and stricture formation in the long term.

Treatment
Objectives: 1-Achieve patent continent urethra 2-Maintain pretreatment sexual potency
**Nerves of the erection pass posterior to the prostate at 5 & 7 O'clock positions, than at both sides of membranous urethra at 3 & 9 O'clock positions
Immediate: 1-Open repair: primary repair (high complication).
  2-Avoid urethral sutures and traction on bl. Neck.
  3-Endoscopic or indirect realignment (quick, minimal morbidity)
Delayed repair with suprapubic cystostomy (If there is no qualified facilities available)

Endoscopic realignment:

Advantages:

1-Healing with no or minimal stricture in 65%   2-Lessen the operative difficulty of open

3-Delayed repair when required (decrease the length of stricture).

****Contraindicated in life threatening injuries and poly trauma.**

Delayed repair:

►Open suprapubic tube and delayed repair after 3-6 months.

Complications: -Indwelling catheter 3-6 months   -Infection   -Stone formation
-Urethral stricture (Not actual urethra so it's called now→ Distraction injury).

**In Partial injury: use either suprapubic tube or catheter under endoscopy in order not to turn it into complete

Urethral disruption in females:

Distal urethra: Continence is preserved

Proximal urethral: -High risk of incontinence
-Immediate retropubic exploration with urethral realignment over stenting catheter.

Anterior Urethral Injury:

Etiology:

A) Blunt trauma

1-Straddle injury: involves the bulbar urethra (fixed location beneath the pubis).
-Blows in the perineum (bicycle handle bars, top of fences)   -Falling astride
-Vehicular injury   -Kicks in the perineum.

2- Sexual Trauma: -Penile Fracture (Urethral injury 20%)   -Urethral Intraluminal Stimulation

3- Constriction Bands: -Ischemic injury

B) Penetrating Trauma

1-Gunshot Wounds (usually associated with penile & testicular injury)

2-Stab Wounds   3-Dog Bites   4-Penile Amputation

C) Iatrogenic Trauma: -Endoscopic Instrumentation   -Urethral Catheters & Dilators

Physical Findings:

1-Triad of: (Blood at the meatus - Inability to urinate - Palpable full bladder)

2-Perineal / scrotal Hematoma (Butterfly appearance)

3-Retrograde Urethrogram: when patient is sleeping oblique, inject contrast under fluoroscopy

Classification: 1-Contusion   2-Partial Injury   3-Complete Injury

Treatment:

-Blunt injury→ Delay repair after Suprapubic cystostomy for 3 – 6 months

-Penetrating injury / Penile fracture→ Primary (immediate) Repair

Urethral Stricture Disease

Definition: anterior urethral disease, or a scarring process involving the urethra & the spongy erectile tissue of the corpus spongiosum (spongiofibrosis). Contraction of this scar reduces the urethral lumen.

Other causes:

1-Inflammatory strictures
- Gonorrhea: were the most commonly in the past (↓ due to good treatment)
- Lichen sclerosus–balanitis xerotica obliterans (LS-BXO).

2-Idiopathic   3-Congenital stricture: infants before they attempt erect ambulation.

Diagnosis:

Radiographic: -RUG & VCUG   -Sonourethrography (**MORE ACCURATE**)

Clinical: -Obstructive symptoms   -Flow rate

Management:

Depends on amount of spongiofibrosis:

A) Minimal fibrosis, short segment stricture (annular stricture < 1.5 cm):

1-Visual Internal Urethrotomy: -Single incision at the 12-o'clock position.
-Urethral catheter for 5-7 days. -Overall Success Approx 30% -ONE Attempt Only

2-LASER: no better results than those with direct cold-knife visual internal urethrotomy.

B) Massive fibrosis, Long segment stricture or Failed one trial of urethrotomy:

1-One stage procedure:

- **a-End-to-end anastomosis: -Complete excision of fibrotic segment.**
  -Widely spatulated mucosa to mucosa urethral anastomosis
  -Tension free anastomosis.
- **b-Grafts (e.g. from Buccal Mucosa)** **c-Penile skin flap**

2-Staged procedure: (not used nowadays)